

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
22 January 2004 (22.01.2004)

PCT

(10) International Publication Number  
**WO 2004/007346 A3**

(51) International Patent Classification<sup>7</sup>: **B67D 5/60**,  
B01F 5/06

(21) International Application Number:  
PCT/US2003/022282

(22) International Filing Date: 16 July 2003 (16.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/396,024 16 July 2002 (16.07.2002) US

(71) Applicant (for all designated States except US): **MIXTEK  
SYSTEM, LLC** [US/US]; 150 Central Park South, Suite  
3210, New York, NY 10019 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GRAY, Richard**

[US/US]; 150 Central Park South, New York, NY 10019  
(US). **MEARS, Christopher** [US/US]; 5 Furnace Road,  
Chester, NJ 07930 (US). **WITTKAMP, Joel** [US/US];  
1101E Aviation Parkway, Morrisville, NC 27650 (US).

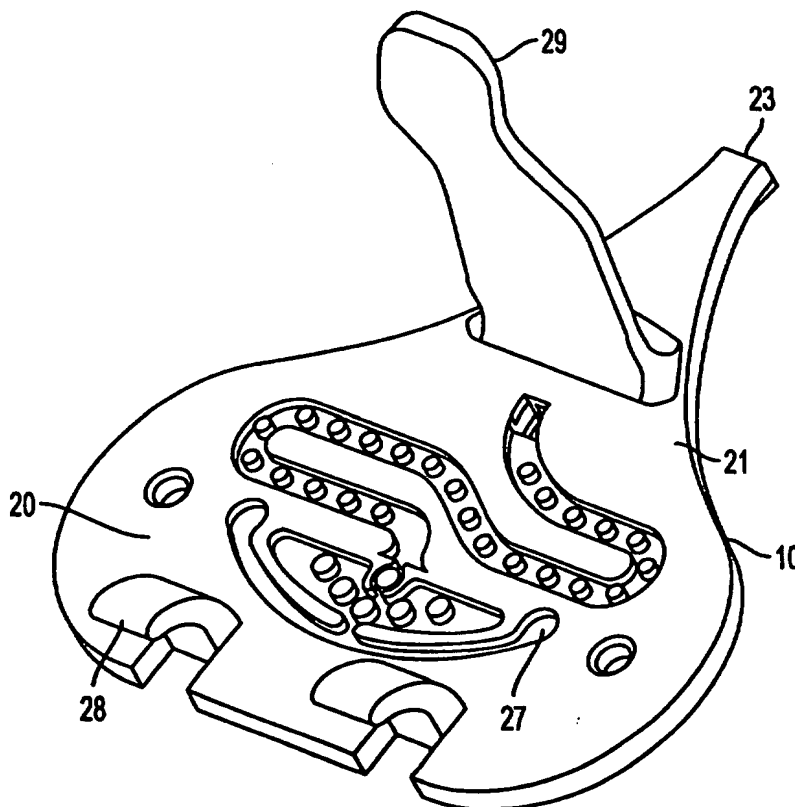
(74) Agent: **GOLLIN, Michael, A.**; **VENABLE, LLP**, P.O.  
Box 34385, Washington, DC 20043-9998 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,  
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,  
VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: AEROSOL MIXING SYSTEM WITH COLUMNS



(57) Abstract: A mixing system and methods for mixing a plurality of constituents from a plurality of containers that includes a collar (30), a head (10), a cartridge (20) and, optionally a base (40). If present, the base is configured to hold and secure at least two containers (50). The collar is configured for coupling to the containers (50). A head (10) is coupled to the collar (20) and contains the cartridge (20). The cartridge includes a plenum (22), a mixing canal (24), and an outlet (23), that are connected to mix the constituents as they pass through the plenum, mixing canal and outlet and are released from the container. The mixing canal (24) includes a plurality of columns (26), which may be of any shape, to facilitate mixing. The system can also include a lever (29) for activating release of the constituents from the containers (50).



European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:  
18 March 2004

**Declaration under Rule 4.17:**

— of inventorship (Rule 4.17(iv)) for US only

**Published:**

— with international search report

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**AMENDED CLAIMS**

[received by the International Bureau on 12 January 2004 (12.01.04);  
New claims 20-30 added]

passing the plurality of constituents around a plurality of columns, thoroughly mixing the constituents; and  
ejecting the thoroughly mixed constituents.

15. The method of claim 14, wherein the columns are cylindrical.

16. The method of claim 14, wherein the columns are oval.

17. A mixing system comprising:

means for activating a plurality of actuators to release a plurality of constituents;

means for separately passing each of the plurality of constituents into a mixing means;

means for mixing the plurality of constituents comprising a plurality of columns; and

means for ejecting the thoroughly mixed constituents.

18. The system of claim 17, wherein the columns are cylindrical.

19. The system of claim 17, wherein the columns number about 10 to about 50.

20. A mixing system comprising:

two containers of constituents;

a cartridge having a mixing canal for the constituents in said containers;

a head for holding said cartridge; and

a collar connecting said head and said cartridge to said containers.

21. The system of claim 20, wherein the head includes a lever to activate release of the constituents into the cartridge.

22. The system of claim 20, wherein the constituents of said containers are released by pressing on the top of said head.

23. The system of claim 20, wherein the mixing canal comprises a hollow through which the constituents are passed and mixed.

24. The system of claim 20, wherein said collar, said head and said cartridge are coupled by a snap-to-fit or friction-fit method.

25. The system of claim 20, further comprising an outlet port through which mixed constituents are dispensed.

26. The system of claim 20, wherein the head internally holds the cartridge.

27. A method of mixing a plurality of constituents from pressurized containers comprising the steps of:

providing two containers that contain the constituents to be mixed;

providing a mixing system that comprises

a cartridge having a mixing canal for mixing constituents contained in said containers;

a head for holding said cartridge; and

a collar;

connecting said containers to said head and said cartridge with said collar;

actuating a valve on each of said containers to release the constituents contained therein by pressing on the top of said head;

separately passing each of the constituents into said cartridge; and  
ejecting the mixed constituents.

28. The method of claim 26, wherein the mixing canal comprises a hollow through which the constituents are passed and mixed.

29. The method of claim 26, wherein said collar, said head and said cartridge are coupled by a snap-to-fit or friction-fit method.
30. A mixing system comprising:
- a) means for activating a plurality of actuators to release constituents from each of a plurality of containers;
  - b) separate means for thoroughly mixing the plurality of constituents, comprising a means for passing each of the plurality of constituents into the mixing means and means for ejecting the thoroughly mixed constituents;
  - c) separate means for attaching the activating means and the mixing means to the containers.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/22282

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B67D 5/60; B01F 5/06,  
US CL : 222/145.5, 366/336

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
U.S. : 222/145.5, 145.1; 366/336, 181.5

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 199 11776 A1 (Merch Patent GMBH) 21 September 2000 (21.09.2000), see entire document.	1-19
A	FR 2 669 243 A1 (PARJUMS GIVENCHY) 22 May 1992 (22.05.1992), See entire document.	1-19
A	US 5,611,463 A (FAVRE) 18 March 1997 (18.03.1997), see entire document.	1-19
A	US 6,281,254 B1 (NAKAJIMA et al) 28 August 2001, (28.08.2001), see entire document.	6, 10, and 16
A	US 6,457,854 B1 (KOOP et al) 01 October 2002 (01.10.2002), see entire document.	5, 9, 15, 18
A	US 3,236,457 A (KENNEDY et al) 22 February 1966 (22.02.1966), see element 17,23, 22.	1-19

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

25 November 2003 (25.11.2003)

Date of mailing of the international search report

29 DEC 2003

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Tony G. Sothoo

Telephone No. (703) 305-0661